

A NOTABLE COLLECTION OF *CYCLORAMPHUS*  
(AMPHIBIA: LEPTODACTYLIDAE) FROM  
BAHIA, BRAZIL, WITH A DESCRIPTION  
OF A NEW SPECIES (*CYCLORAMPHUS MIGUELI*)

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*Abstract.*—Members of the frog genus *Cycloramphus* were unknown north of the Rio Doce, Espírito Santo, Brazil until 1986, when two species of the genus were collected in southern Bahia, Brazil. The first, *Cycloramphus fuliginosus*, was previously known from the states of Espírito Santo and Rio de Janeiro. The second species is new and described as *Cycloramphus migueli*.

Hypotheses are made to be tested by new data. Heyer & Maxson (1983:356) predicted that members of the frog genus *Cycloramphus* did not occur north of the Rio Doce within the Atlantic Forest Morphoclimatic Domain. The ecology of most *Cycloramphus* species is closely associated with small, fast-flowing mountain streams; topographic maps indicated that there were no areas north of the Rio Doce with enough topographic relief to provide suitable habitat. Prior to 1986, no *Cycloramphus* had been collected north of the Rio Doce. However, in October of 1986, Miguel T. Rodrigues collected two species of *Cycloramphus* from Fazenda Unacau and Rio de Una, Bahia, and saw one individual of a third (distinct, possibly new) species. Twelve specimens of *Cycloramphus fuliginosus* were collected along small (½–1½ m wide), fast flowing, clear streams with rocky bottoms. Most specimens were encountered in the forest, and a few where the forest was replaced by cacao plantations. Dr. Rodrigues also collected, among rocks about 100 m from a stream, a single specimen of *Cycloramphus* representing a new species, proposed herein as:

*Cycloramphus migueli*, new species  
Fig. 1

*Holotype.*—MZUSP 63450, adult male, from Brazil: Bahia; São José (do Macuco), Fazenda Unacau, 15°09'S, 39°18'W; Miguel T. Rodrigues, 13 Oct 1986.

*Diagnosis.*—The webless species of *Cycloramphus* are *bolitoglossus*, *carvalhoi*, *catarinensis*, *diringshofeni*, *eleutherodactylus*, *granulosus*, *migueli*, *stejnegeri*, and *valae*. The toes are free of web and fringe and the dorsum is smooth in *C. migueli*; the toes are ridged or fringed and the dorsum warty-granular in *catarinensis*, *granulosus*, and *valae*. The leg is shorter in *C. migueli* (e.g., foot length 36% SVL) than in *diringshofeni* (average foot length 50% SVL in males) or *eleutherodactylus* (average foot length 48% in males). *Cycloramphus migueli* is most similar in appearance to *bolitoglossus*, *carvalhoi*, and *stejnegeri* (this grouping was previously recognized as the genus *Craspedoglossa* [see Heyer 1983, for discussion]). The venter and posterior thigh surfaces of *C. migueli* are dark with small, distinct, irregular light spots; the venter and posterior thigh surfaces of *C. carvalhoi* are uniform



Fig. 1. Dorsal and ventral views of holotype of *Cycloramphus migueli*.

brown; and the throat, chin, and posterior thigh surfaces of *C. stejnegeri* are dark brown with distinct light spots, while the belly is mostly unpigmented. In addition, *C. migueli* is smaller (male SVL 42 mm) than either *carvalhoi* (male SVL 59–62 mm) or *stejnegeri* (male SVL 45–47 mm). The ventral and posterior thigh patterns of *C. migueli* and *bolitoglossus* are similar. The two species differ in size (*C. migueli* male 42 mm SVL, *bolitoglossus* males 29–34 mm SVL) and *C. migueli* has a distinct fold, from the posterior corner of the eye to the shoulder, which is lacking in *C. bolitoglossus*.

*Description of holotype.*—Snout nearly round from above, slightly obtuse in profile; canthus rostralis indistinct; loreal convexly obtuse in cross section; tympanum hidden; vomerine teeth in obtuse series posterior to and between choanae; no vocal slits or vocal sac; first finger just longer than second; fingers lacking fringe or web; outer metacarpal tubercle large, square with rounded corners; inner metacarpal tubercle large, oblong, separated from subarticular tubercle of thumb by less than diameter of subarticular tubercle; thumbs lacking asperities; dorsal and ventral textures smooth; fold from posterior corner of eye to shoulder; inguinal

gland large, circular, diameter greater than  $\frac{1}{3}$  length of thigh; toe tips rounded, not expanded; toes without fringe or web; subarticular tubercles under toes weakly developed; outer metatarsal tubercle large, rounded, elongate, about  $\frac{1}{2}$  size of oblong inner metatarsal tubercle; no tarsal or metatarsal folds; posterior surface of tarsus and sole of foot smooth.

SVL 42.1 mm, head length 16.1 mm, head width 19.2 mm, eye–nostril (middle of opening) distance 3.0 mm, thigh length 17.3 mm, shank length 14.0 mm, foot length 15.1 mm.

Dorsum with a dark, finely lichenous pattern of black and brown; brown interorbital band; face mostly black with three indistinct, slanted stripes from eye to edge of upper lip, most anterior stripe directed forward from eye, other two directed posteriorly; flank same color as dorsum; inguinal gland uniformly dark; upper limb surfaces barred black and brown; tips of digits white; venter black with small distinct white dots; under-surfaces of hands and feet gray with all tubercles and digit tips conspicuously white; posterior surface of thigh dark brown with small, irregular, distinct, light spots.

*Etymology.*—Named for Dr. Miguel T.

Rodrigues, who has made significant collections of frogs throughout much of Brazil.

*Distribution.*—Known only from the type locality (Fig. 2).

### Discussion

The occurrence of *Cycloramphus fuliginosus* in the State of Bahia is surprising for two reasons. First, no member of any stream associated species group of *Cycloramphus* was expected north of the Rio Doce (Heyer & Maxson 1983:356). However, small, swift, clear streams obviously occur north of the Rio Doce, comparable in habitat to those found south of the river. Intensive collecting now will have to be done to ascertain the northern distributional limits of *Cycloramphus* in the Atlantic Forest system. Second, the occurrence of *C. fuliginosus* is in itself surprising. All other members of the same species group have much smaller geographic ranges (see Heyer 1983, and Heyer & Maxson 1983) than *C. fuliginosus*. As currently understood, *C. fuliginosus* is not continuously distributed throughout its range; rather it is known from three small areas in the State of Rio de Janeiro (in or near the city of Rio de Janeiro, Corcovado, and the Serra da Mangaratiba [Heyer 1983, fig. 38]); one locality in Espírito Santo (Santa Teresa); and now two nearby localities in southern Bahia (Fig. 2). There is no morphological differentiation among the samples from the states of Rio de Janeiro, Espírito Santo, or Bahia. In fact, all the Bahia and Espírito Santo individuals have the distinct tripartite odontoids on the lower jaw pointed out by A. Lutz (1929:10) as characterizing *C. fuliginosus*. As this characteristic often appears late in the ontogeny of *C. fuliginosus*, being found consistently only in large specimens (Lutz 1929:10), I did not include the character in my previous work (Heyer 1983). Additional data confirm Lutz's observation that *C. fuliginosus* is the only species of *Cycloramphus* to have bipartite or tripartite mandibular odontoids. Thus, it would ap-

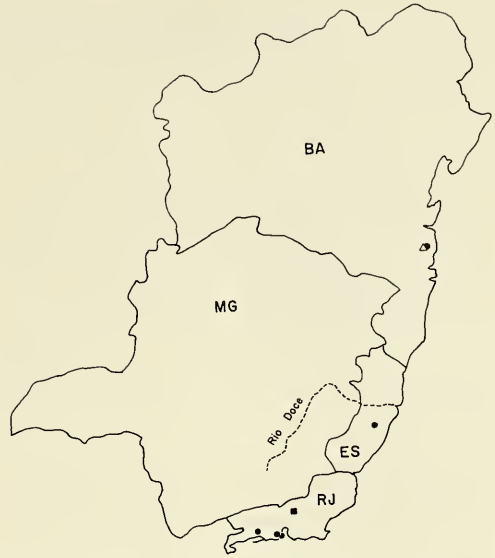


Fig. 2. Distribution of *Cycloramphus migueli* (triangle), *C. fuliginosus* (dots and triangle), and *C. stejnegeri* (square) in eastern Brazil. *Cycloramphus stejnegeri* geographically is the closest member of the species cluster to which *C. migueli* belongs. State initials, BA = Bahia, ES = Espírito Santo, MG = Minas Gerais, RJ = Rio de Janeiro.

pear that *C. fuliginosus* either (1) has until relatively recently had a continuous distribution but now is divided into relictual populations, or (2) has been separated for a longer period of time but has not undergone morphological differentiation characteristic of other species of *Cycloramphus* isolated for similar periods of time. Estimates of genetic relatedness among the Rio de Janeiro, Espírito Santo, and Bahia populations are needed to resolve the issue.

*Cycloramphus migueli* has a morphology indicative of a fossorial existence and, along with its presumed closest relatives (*bolitoglossus*, *carvalhoi*, and *stejnegeri*) most likely has some form of direct development (Heyer & Crombie 1979). These four species are allopatric, each with a small geographic range (*bolitoglossus* occurs in the Serra do Mar in the states of Paraná and Santa Catarina, *carvalhoi* in the Serra da Mantiqueira, and *stejnegeri* in the Organ Moun-

tains, Fig. 2 and see Heyer 1983, figs. 30, 42). Assuming that *C. migueli* is closely related to *bolitoglossus*, *carvalhoi*, and *stejnegeri*, it is not surprising that a population found in Bahia would represent a new species, nor that a member of this cluster would occur in the Atlantic Forests north of the Rio Doce as species with direct development should be able to occur throughout the Atlantic Forest Domain.

From the same localities in Bahia, Dr. Rodrigues collected species of *Crossodactylus* and *Hylodes*, two genera typically found in the same streams as *Cycloramphus* south of the Rio Doce. Notable by its absence from these collections is a representative of the genus *Thoropa*, which elsewhere is found in the same types of habitats as *Cycloramphus*.

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